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ABSTRACT

The development of the first microcomputers in the 1970's has led to a quiet revolution in the use of computers in the school. Computers have proven themselves as effective teaching tools and now, for the first time, these tools are within realistic reach for all levels of education. Under the three major areas of administration management, instruction, and counseling and guidance, educational applications include master student filing, attendance, grading, scheduling, bookkeeping, office use, tutorial programs, drill and practice, simulation and games, diagnosis and prescription, career guidance, and testing. A vital prerequisite to the application of microcomputers in education is that of computer literacy. Competencies should include terminology, simple programming, applications, history, and social impact issues. The recent introduction of a variety of authoring languages has allowed educators, administrators, and counselors to become directly involved in developing programs for their specific content areas. Although a wide variety of computer applications are currently available, the real potential for computers in education has not yet been fully realized. This paper includes a list of 14 software suppliers. (Author/LMM)

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MICROCOMPUTERS IN EDUCATION

by

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MICROCOMPUTERS IN EDUCATION

The development of the first microcomputers in the mid-1970's is leading to a quiet revolution in the use of computers in the school. The technical breakthrough at the heart of these microcomputers is the microprocessor chip. This incredibly small chip contains the computing power traditionally found only in very large computers that are available only on a time-sharing basis. Today's microcomputers, with many of the same capabilities as the large computuers, cost as little as twenty five hundred dollars. Large computers have to be operated by a trained computer operator, whereas today's microcomputers may be operated by virtually anyone.

With the ease of operating today's microcomputers and relative low cost, computers, for the first time, have become a practical reality for schools of virtually any size and available to virtually all students. The very fact that the microprocessor chip has greatly reduced the costs of computing has broad implications for all levels of society as well as education. The application of microcomputer technology throughout all levels of society is expanding at a phenomenal rate. More than ever, education has need to keep pace with that technology and take advantage of that technology in order to educate. The need for literacy in computers will continue to expand and may eventually become as fundamental a subject as the traditional three R's. The very rate of growth of computer development requires that its technology be applied in the education of its consumers. Computers have already proven themselves as effective teaching tools (Poirot). Now, for the first time, these tools are within realistic reach of all levels of education.

Briefly, the major areas of application include:

1. Educational Administration Management
2. Educational Instruction
3. Educational Counseling and Guidance

A vital prerequisite to the application of microcomputers in education is that of computer literacy. Computer literacy is necessary to provide administrators, teachers, and students with the fundamentals with which to apply microcomputers to education. Among the competencies to be developed under computer literacy are:

1. Have a working knowledge of computer terminology;
2. be able to read and write simple programs;
3. understand the type of problems that are and are not open to

computer solution;

4. know some of the history of computing;

5. understand some of the moral and human impact issues of using computers.

A summary of director microcomputer applications in the area of Educational Administration include the following:

1. Master Student File - complete records of all students may be compiled and stored on inexpensive diskettes. The masterfiles may include all materials that are normally carried in usual paper files and have the advantage of analyzing and processing all of these records quickly.

2. Class attendance and tardiness - daily attendance and tardiness records may be compiled on inexpensive diskettes with record keeping being handled by secretarial or student aid help. Attendance and tardiness records for each student may be reported on a daily, annual, or any school period interval. Since these records are compiled on a daily basis, the data base is cumulative and may be analyzed a number of ways necessary for annual reports or various accountability studies.

3. Grading and grade analysis - test papers may be scored and resulting grade records may be compiled using the microcomputer. Those grade reports may be subjected to analysis to determine performance records for accountability or research studies.

4. Grade reporting - records of individual grades as well as class grades and class standings may be created and reported.

5. Scheduling - all types of scheduling including class schedules, physical facility scheduling, such as classroom utilization, may be performed. Individual student class schedules may be generated as well as teachers' schedules and classroom assignments.

6. Bookkeeping and Inventories - microcomputers provide for excellent bookkeeping and inventory control. These services can include such things as monitoring accounts for various departments, clubs and funds throughout the school, providing inventories for expenditures such as janitorial supplies, audio-visual equipment, books, etc. . . and issuing checks for payment of various accounts.

7. Office Use - in addition to bookkeeping and payroll services, microcomputers may be used in the office for various file and record keeping and word processing of a variety of memoes, reports and form letters required

in accountability and general office operations.

A second major area of microcomputer application includes a number of instructional uses. The most direct instructional impact of all educational uses is that of Computer-Assisted Instruction (CAI). CAI takes one or more of the following forms:

1. Tutorial Programs - these programs present material to the student and asks her or him to answer questions concerning that information. It is not assumed that the student has prior knowledge of this subject matter. Tutorial programs may be used either in conjunction with or independent of the classroom teacher. Thus, new concepts may be taught solely through the use of tutorial materials or in conjunction with regular classroom instruction. In this type of program, wrong answers by the student result in additional help from the program.

2. Drill and Practice - after the instruction of a concept either by a tutorial program or a teacher, repetitive practice is often necessary to complete the understanding or reinforce the new learning. The microcomputer will provide a random presentation of appropriate work level exercises.

3. Simulation - simulations provide approximations of real life operations. Simulations allow the study of events beyond the normal capability of our senses; such as events that occur too quickly or too slowly for us to normally perceive with our senses. For example, the internal operation of an automobile engine which normally operates at very high speeds may be studied through a simulation of its operation.

4. Games - educational games allow for training and practices in a variety of skills. The competition among individuals and within an individual inherent in most games provides a strong motivator for learning.

Included under the topic of instruction is the area of Computer Managed Instruction (CMI). In addition to the functions carried out under Computer Assisted Instruction (CAI), Computer Management Instruction includes diagnosis, prescription, data collection and data reporting capabilities. In this application, students take a pretest from which the computer develops a student prescription. Thus, when a student asks for information, the computer can provide a prescription which might consist of chapters to read, problems to work, activities to perform, etc. CMI also offers the opportunity for the computer to keep records of when and how often the student takes tests, the scores, the

material covered, dates that the student worked on the computer, and so forth. Thus, the computer serves in the role of analyzing the results of a student's activity, reporting those activities and suggesting possibilities for additional student work.

The newest application of microcomputers is in the area of career guidance. Several traditional time-sharing programs have now been adapted to operate on microcomputers, usually at a lower cost. These adaptations include:

SIGI (System of Interactive Guidance and Information) developed by Educational Testing Service. It is an interactive program which helps the student clarify values and examine the impact of those values on career planning.

Discover II, by the Discover Foundation, is an adaption of the original time-sharing Discover program and provides for self-information, and searches for occupation and educational information.

New programs developed specifically for microcomputer include:

COIN (Coordinated Occupational Information Network) from Bell Howell provides an interactive search program for occupational and educational information. Results from the searches are used in conjunction with a microfiche system for more specific information retrieval.

Career Scan II, developed by the Vocational Studies Center, is a somewhat smaller and less expensive program. This program provides for an interactive occupational search that is keyed to federal publications such as the Occupational Outlook Handbook and The Guide to Occupational Exploration.

Additionally, microcomputers may be used by the counselor in administrative and testing activities. Examples of these types of programs include:

Advisor Aid (LNS Software) helps the counselor track, register and provide progress reports on students.

I.Q. Test (Creative Computing) provides quick I.Q. guide through multiple choice questions.

Job Readiness (Interpretive Education) assesses and teaches job readiness, application filing and placement process.

The Counselor's Program (Charles Mann and Associates) helps in the creation of master student records and file folder labels.

Although there is a wide variety of computer application currently available, the real potential for computers in education has not been fully realized. Existing software has largely been the work of computer programmers rather than educators. Only recently has the teacher, administrator, and counselor become directly involved in applying their own creative techniques to this new technology. The new development that allows educators this opportunity is the introduction of a variety of authoring languages. These authoring language programs allow an educator with very limited computer background to quickly develop programs for their specific content areas. Using an authoring language program such as PILOT, a finished program may be created in a single day that previously would have taken a professional programmer weeks to construct when working with the educator. Among the authoring languages currently available to microcomputer users include: GENIS I, SHELL GAMES, CAIWARE, C.A.T.I., and GROW

Software Suppliers

Apple Computers Inc. (Shell Game)
10260 Bandley Dr.
Cupertino, CA 94017

Bell and Howell (GENIS I)
Audio Visual Products
7100 N. McCormick Road
Chicago, Illinois 60645

Charles Man and Associates (The Counsellor's Program)
7594 San Reno Trail
Yucca Valley, CA 92284

COIN
1546 Dartford Road
Maumee, OH 43537

Computer Systems Design Group (GROW)
3632 Governor Dr.
San Diego, CA 92122

Cook's Computer Co. (PILOT)
1950 Bailey Dr.
Marshalltown, IA 50158

Creative Computing (I.Q. Testing)
Dept. 301, P.O. Box 789M
Morristown, NJ 09760

Discover Foundation, Inc. (Discover II)
P.O. Box 363
Westminster, MD 21157

Interpretive Education (Job Readiness)
2306 Winters Drive
Kalamazoo, MI 49002

LNS Software (Advisor's Aid)
1002 Indian Head Drive
Sara Hill, NC 28580

MicroGrnome, Fireside Computing Inc. (CAIWARE)
5843 Montgomery Rd.
Eldrige, MD 21227

SIGI Office (SIGI)
Educational Testing Service
Princeton, NJ 08541

Vocational Studies Center (Career scan ii)
University of Wisconsin-Madison
265 Educational Science Bldg.
Madison, WI 53706

Whitney Education Services
2701 10th Ave.
San Francisco, CA 94116